A CONTENT OF GLUCOSE IN HEMOLIMPH OF PULMONARY FRESHWATER MOLLUSCS WITH INFLUENCE OF ZINC AND LEAD SULPHATES (II)

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Any changes in the hydrochemical or hydrological regime of the reservoir significantly affect the homeostasis of organisms that live permanently in the aquatic environment. It is known, that aquatic organisms, concentrating trace elements, thus ensure the normal synthesis of biologically active substances such as enzymes, hormones and vitamins. However, a toxic one in the case of concentrations exceeding their normal content replaces the physiological effect in the body [1].

The purpose of the study was to investigate the effect of heavy metal salts (lead sulfate (II), zinc sulfate (II)) in varying concentrations on the glucose content in the hemolymph of pulmonary freshwater mollusks.

Material and methods. The experiments were performed on pulmonary freshwater mollusks of *L. stagnalis* (72 specimen) and *P. corneus* (72 specimen). Mollusks were gathered in autumn (September-October) in the reservoirs of the Vitebsk region.

Before the experiment for an acclimatization, the mollusks were kept in containers with standing tap water for 2 days, the density of the mollusk planting was 3 copies / l, the water temperature was 20–22°C above zero, pH 7.2-7.7. 1/3 of its volume was replaced every day. The animals were fed on fresh dandelion leaves or a green salad.

Toxicological experiments were carried out using zinc and lead salts with the aim to model pollution of reservoirs with salts of heavy metals. The following salts of heavy metals were used in the experiments: zinc sulphate $ZnSO_4 \cdot 7H_2O$ in a concentration of 0.05; 0.5 and 5.0 mg / l and lead sulfate $PbSO_4$ at a concentration of 0.005; 0.05 and 0.5 mg /l.

Hemolymph in *P. corneus* and *L. stagnalis* was obtained by stimulating the leg with the needle from the syringe. The isolated hemolymph was collected by a mechanical pipette. Hepatopancreas was taken from the mollusks after taking the hemolymph. By mechanical action, the mollusk shell was crushed and the hepatopancreas was carefully separated from the connective and adipose tissue.

Determination of the glucose level in the hemolymph was carried out with a glucose oxidase method by the DiakonDiases kits [2].

Mathematical processing of the results was carried out using parametric and nonparametric statistics using a package of statistical programs Microsoft Excel 2003 and STATISTIKA.

Results and their discussion. Hepatopancreas is a source of glucose of hemolymph in mollusks. Metabolic processes in the body of mollusks are more intensive under the influence of salts of heavy metals, as evidenced by a reduction in the reserves of the most important energy substrate – glycogen.

When zinc sulfate (II) concentration of 0.05 mg / l occurs, the level of glucose in the hemolymph of pond food grows 2.4 times, and in coils 1.8 times, with exposure to zinc sulfate of 0.5 mg / l concentration in pond food glucose increases in 2,7 times, and in coils – 1,3 times, and with the action of zinc sulfate (II) concentration of 5,0 mg / l, the glucose level in the hemolymph of pond food grows 1.7 times, and the coils have a decrease in glucose in 1,6 times in comparison with the control group. There is a decrease in glucose level in the hemolymph of pond food in 1.4 and 1.6 times under the influence of zinc sulfate (II) in concentrations of 0.05 mg / l and 0.5 mg / l there is a decrease in glucose level in the hemolymph of pond food in 1.4 and 1.6 times, respectively, and in coils - in 3 and 2.2 times, respectively compared to the $ZnSO_4$ group, 5.0 mg / l (Table 1).

Table 1 – Effect of zinc sulfate (II) on glucose in the hemolymph *L. stagnalis* and *P. corneus (M ± m)*

Groups (n=9)	*Lymnaea stagnalis*	*Planorbarius corneus*
Control	0,52 ± 0,14	0,974 ± 0,25
$ZnSO_4$, 0,05 mg/l	1,25 ± 0,21*	1,785 ± 0,33*
$ZnSO_4$, 0,5 mg/l	1,38 ± 0,11*	1,303 ± 0,24*
$ZnSO_4$, 5,0 mg/l	0,89 ± 0,16*	0,598 ± 0,07

Note –*P <0.05 compared with the control group

Under the influence of lead sulfate (II) with a concentration of 0.005 mg / l: the glucose level in the hemolymph of the ponders increase by 2.9 times, the level of glucose in the hemolymph does not change in the coils, the content of glucose increases by 1.2 times in the case of lead sulfate (II) with a concentration of 0.05 mg /l, while in coils it decreases by 1.4 times, and when lead sulfate concentration of 0.5 mg / l occurs, the glucose level in the hemolymph of pond food grows 2.5 times, and the coils have an increase in the glucose content by 1.3 times in comparison with the control group. Under exposure to lead sulfate (II) at a concentration of 0.05 mg / l: the level of glucose in the hemolymph of pond food is reduced by a factor of 2.4, while in coils exposed to $PbSO_4$, 0.5 mg / l increases 1.3 times as compared with the $PbSO_4$ group 0.005 mg / l (Table 2).

Table 2 – Effect of lead sulphate (II) on glucose in the hemolymph *L. stagnalis* and *P. corneus* *(M ± m)*

Groups (n=9)	*Lymnaea stagnalis*	*Planorbarius corneus*
Control	0,51 ± 0,14	0,97 ± 0,25
$PbSO_4$, 0,005 mg/l	1,48 ± 0,23*	0,97 ± 0,35
$PbSO_4$, 0,05 mg/l	0,61 ± 0,12*	0,68 ± 0,19
$PbSO_4$, 0,5 mg/l	1,30 ± 0,33*	1,25 ± 0,35

Note – *P <0.05 compared with the control group

Conclusion. Investigating the influence of lead sulphate (II) and zinc sulfate (II) in varying concentrations on the glucose content in the hemolymph *L. stagnalis* and *P. corneus*, it can be concluded that the heavy metal salts increase the glucose content in the hemolymph. The horn coil proved to be more resistant to the toxic effect of salts of heavy metals. Thus, zinc sulfate (II) and lead sulfate (II) cause metabolic changes in the body of mollusks, which are characterized by changes in carbohydrate metabolism.

Reference list:

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IDENTIFICATION OF THE GROWTH FEATURES OF THE CANADIAN GOLDENROD DURING THE VEGETATIVE PERIOD

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The Canadian goldenrod is a decorative plant, brought to Belarus in the 50th years of the 20th century [4]. *Solidago canadensis* L. can form tangles, reducing species diversity not only of the vegetation communities, but insect pollinators too. Also pollen of the goldenrod can cause allergic reaction in people, especially in children [3]. That's why the Canadian goldenrod is carried to moderately poisonous plants [1].

Roots of this plant contain substances-inhibitors, thanks to which *Solidago canadensis* L. forces out other species of plants in a short period of time. The Canadian goldenrod extends with a speed in several tens of hectares a year. For several years it is capable to bring meadows and edge sites to an unsuitable state, and these territories can't be used for mowing or a pasture of the cattle. In the autumn old stalks can become the reason of the fires [2].